# MARYLAND FISHERIES

PUBLISHED BY CONSERVATION DEPARTMENT OF MARYLAND

No. 18 BALTIMORE, MARYLAND September, 1932

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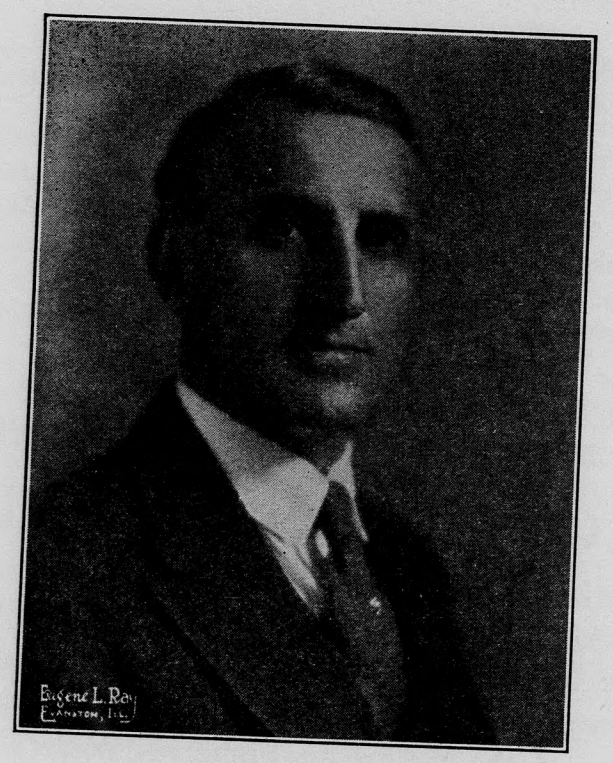
# WELCOME TO MARYLAND

## Delegates Attending the Twenty-sixth Annual Convention of the International Fish, Game and Conservation Commissioners and the Sixty-second Convention of the American Fisheries Society

IT IS A GREAT PLEASURE to have such a distinguished group of men hold their annual convention in Baltimore and give Maryland an opportunity to hear scientific papers on fisheries and game, subjects which are of such great interest to our people.

The Conservation Commissioner of Maryland extends a most hearty welcome to all those attending the convention, and trusts that your stay in the State will be an enjoyable one.

The Chesapeake Bay Trip, which is scheduled for September 21, promises to be one of much interest and the visitors will see, many for the first time, our great Bay and one of its tributaries, the Severn River, on which is located the United States Naval Academy and other features in the quaint and historic town of Annapolis.




HON. SETH E. GORDON, *President American Game Association, and Secretary American Fisheries Society.*

## IMPORTANT MEETING OF OYSTER PACKERS AND OYSTERMEN, CRISFIELD, SEPTEMBER 7, 1932

AT THE INVITATION of Mr. Wallace M. Quinn, well-known oyster packer of Crisfield, the Conservation Commissioner proceeded to Tangier Sound on the morning of September 7, arriving at Crisfield on the State Steamer "Gov. McLane" shortly after noon.

One of the largest delegations of oystermen ever assembled on the Eastern Shore gathered in the oyster house of Mr. Quinn, where a meeting was held to talk over the general oyster situation and especially the condition of the Potomac River.

Commissioner Earle, in dealing with the general sea-food subject affecting Maryland waters, and especially Tangier Sound, then referred to the situation in Potomac River as follows:

"Referring to the oyster supply of Crisfield, I know that the watermen of Somerset County have resorted for many years to the oyster bars of the Potomac River, not only because this river is convenient but because it has produced fine oysters and a great quantity of oysters. I think of all the waters of Maryland, while the Potomac really belongs to our State yet is used by Virginia, this river has been most shamefully treated. In the first place, in 1785, when the Compact was made between the two States, there was no provision for proper policing and protecting the fisheries of the Potomac, and it was not until 1912, after a delay of 127 years, that an agreement was reached for proper protection of these resources.

"In 1928 a survey was made of the Potomac River oyster bars under the supervision of the United States Bureau of Fisheries, and their condition was found to be most serious. Many of the bars were entirely depleted of shells, and others were in such bad condition that they no longer afforded a livelihood to the watermen. However, the Conservation Department was not in a position to shell the oyster rocks without the aid of Virginia, and that State claimed they had no money for this work. The only thing left to do was to close the river, first by Virginia, and then similar legislation was passed in Maryland.

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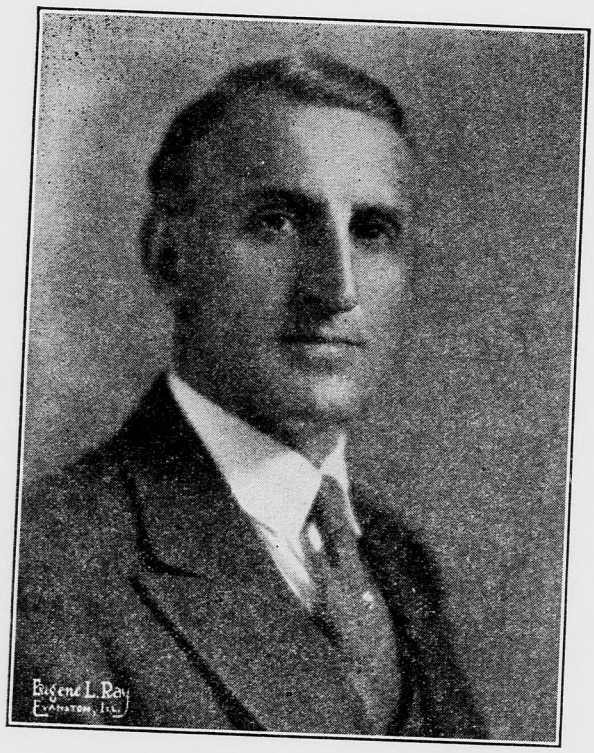


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"The rest, for even the short period of one season, has made quite a change in the condition of the bars, and many show

a marked improvement. If shelling could have supplemented the rest period, we might expect a much more rapid building up than is taking place. However, with proper handling, I feel that the Potomac River will come back and once more give a substantial supply of oysters to Crisfield, as well as employment to the watermen of this county. I do feel that supervision of this work should be left with the two States, in order that certain sections of the river may be opened at a time when we feel that the opening of the river is justified. I do not believe that the watermen of Somerset County would be in favor of large schooners with heavy dredges, which did so much to destroy the oyster bars of Potomac, again resorting there. I do feel that a plan can be worked out whereby this river may be used by the watermen, so that part of the river may be used and part protected and not worked each year, in order that the young growth may have a chance to mature. I know that the watermen of Somerset are extremely interested in this subject, and I feel that Governor Ritchie desires to do anything in his power to assist them, and I assure you that the Conservation Department also feels that way. I would be very glad, Mr. Chairman, if a committee of five men be selected from this county to accompany me to the Potomac River early in October, in order to see the condition of the oyster bars as they are at present. I know that they would feel better satisfied, and I should be glad to have your cooperation in this important work."

## JAPANESE OYSTERS

WHILE the East Coast crab packer and shipper have been much disturbed over a campaign that is being made to advance the sale of Japanese and Russian crabmeat along the East Coast of the United States, another serious menace appears on the surface in the way of Japanese seed oysters, for which a market is now being sought in the United States.

At the annual convention of the Oyster Growers and Dealers of North America, held at Atlantic City in August, a resolution was adopted calling upon the Department of Agriculture to prohibit the importation of Japanese oysters for growth and planting in United States waters.

Dr. Galtsoff, of the U. S. Bureau of Fisheries, and in charge of the oyster investigations of that Bureau, has given the subject of the Japanese oyster painstaking study and con-

sideration, and it is his opinion that the interests of the oyster industry will best be served by preventing the introduction of these oysters on the Atlantic Coast. His reasons for arriving at this conclusion, according to a letter from the Bureau of Fisheries, are as follows:

"(1) The Japanese oyster is not superior to the eastern oyster in appearance, flavor, or palatability. The black edge around the mantle gives it a different appearance to which the consuming public would have to become accustomed.

"(2) The rapid growth of the Japanese oyster would necessitate its being marketed immediately upon reaching market size, as it could not be carried over for marketing later on when it would be much too large to meet the requirements of the oyster trade.

"(3) Should the Japanese oyster fail to spawn, as now happens on the Pacific Coast, the presence of a large amount of sexual products in their bodies would unfavorably affect the quality of the meat. Such oysters would not stand up well in shipping and would sometimes develop a bitter taste.

"(4) With the importation of seed oysters there is danger of introducing pests which in time might destroy our native oysters.

"(5) If the Japanese oysters should fail to propagate on this coast, American producers would always be dependent upon foreign sources of supply for their seed oysters. Present market conditions and the keen competition among the oyster-producing states call for the production of oysters of the highest quality. Present methods of production make available an adequate supply of domestic stock to meet existing demands. The results of attempts to acclimatize Japanese oysters cannot be foreseen, but in the light of the foregoing it would appear fraught with danger to the domestic industry."

# MARYLAND FISHERIES

PUBLISHED BIMONTHLY BY CONSERVATION DEPARTMENT,
SWEPSON EARLE, Commissioner.

No. 18 BALTIMORE, MARYLAND September, 1932


## SPORT FISHING IN THE BAY

MANY ANGLERS OF MARYLAND were astounded last week when the announcement was made, by the Conservation Department, that one week's fishing in Chesapeake Bay brought to our shores 16,805 persons seeking this form of outdoor recreation, and meant that 2,621 boats made trips during that week to take out parties to the fishing grounds with which our State is so well supplied.

Maryland's salt-water area, of more than 2,300 square miles, contains many varieties of fish, many of which, if their scientific names were given, would be entirely unfamiliar to the average angler of the State. A number of these fish are not caught daily, and many are seldom seen by the fisherman who resorts to the Chesapeake.

Ninety per cent of those who fish in the Bay have in mind, when they go on a fishing trip, striped bass, sea trout or squeteague, bluefish or large-mouth bass. These may be classed as the sport fish of the Bay, although hardheads, perch, drum, spot, and croakers are taken in large numbers in a day's fishing.

Maryland is very fortunate in having many resorts along her great salt-water shoreline of 3,000 miles, where boats await the angler to take him, within the space of an astonishingly short time, to excellent fishing grounds. Notable among these resorts is Solomon's Island, located on the Patuxent River and the Bay. Good fishing is to be found within easy reach of Solomon's Island at almost any time, and at present it is particularly fine.

According to the recent check-up on fishing parties, Solomons

headed the list, partly because of its proximity to the great metropolitan areas of Washington and Baltimore, but chiefly because successful fishing is the rule rather than the exception in this region of the Bay. The little villages of Broome's Island and Benedict, farther up the Patuxent River, also attract their share of sport fishermen, and Chesapeake Beach and the section around Herring Bay, West, South and Severn Rivers have their devotees. Deal's Island, Cambridge, Tilghmans, Rock Hall, Oxford, St. Micheals, and Bivalve are all familiar names to those who pursue the finny tribe.

Along the historic Potomac, close to Blakistone (formerly St. Clement's) Island, where the Ark and the Dove gratefully dropped anchor on a certain morning in March, 1634, after a stormy and eventful voyage from Gravesend, England, the angler finds not only some of the best fishing in the Bay, but he is in a region where the first scenes of Maryland's interesting history were enacted.

Here, on the St. Mary's River, not far from Blakistone Island, is located the first city and capital of the State, little old St. Mary's City, established shortly after the landing in 1634. Built on the site of an Indian Village, which Leonard Calvert bought from a tribe that was about to abandon it, St. Mary's City never grew much beyond the 40 brick houses which existed at the time of its greatest importance. This region developed around the watercourses, which were then its only highways and means of communication with the world outside, and which are still, today, Maryland's greatest charm.

But the history of the State is not bound up in the Potomac alone, although that river saw the earliest settlement of the Bay Country. The Patuxent, and the waters of the upper Bay, as well as the Eastern Shore tributaries, such as the Choptank, Chester, Tred Avon, and Miles Rivers, and Tangier Sound all played a part in our history, and the fisherman, during lulls when the fish are not biting, may review Maryland's great past, and, if he has a lively imagination, reconstruct some of the stirring scenes of those early days which took place on the very waters where he idly sits dreaming and waiting for the next "strike."

## OYSTER GROWERS AND DEALERS AND NATIONAL ASSOCIATION OF SHELL-FISH COMMISSIONERS MEET AT ATLANTIC CITY, AUGUST 24, 25, AND 26, 1932

THE JOINT CONVENTION of the Oyster Growers and Dealers' Association of North America with the National Association of Shell-Fish Commissioners was held this year at the Hotel Ambassador, Atlantic City, August 24, 25, and 26.

Conservation Commissioner Swepson Earle, who planned to attend the meeting, was prevented from doing so by official business which required his presence in Baltimore, and the Department was represented by Chief Clerk H. H. Johnson.

The Atlantic City meeting devoted itself entirely to the commercial or practical side of the oyster business, and no scientific papers were submitted. A brief summary of the convention gives the following highlights:

1—A resolution was adopted calling upon the United States Department of Agriculture to prohibit any importation of Japanese oysters for growth and planting in the United States waters. (An article on the subject of the Japanese oyster, giving the opinion of one of the Bureau of Fisheries experts as to the advisability of introducing this oyster on the Atlantic seaboard, is given elsewhere in this magazine.)

2—A committee from the States of New Jersey, Connecticut, Rhode Island, and New York was appointed to determine the question of holding its members down as to the price for which oysters should be sold.

3—Maryland, Virginia, and other Southern States were "ostracized" by the Oyster Growers and Dealers' Association, in so far as admitting them to any distributional plans which this association has in regard to marketing oysters.

4—Rules and regulations were adopted by the New Jersey Oystermen's Association for conducting the oyster business, especially with regard to the relation between oyster growers and packers, and between the packers themselves.

5— A lack of enthusiasm on the part of the Oyster Growers and Dealers' Association as to nation-wide advertising of oysters was observed, the association members feeling that success will come without national advertising to the packer who conducts his business on a proper basis, based upon the relation of cost price to the distributional value, as well as the grade of oysters packed.

## ANGLERS PROFITABLE TO BAY COUNTRY

WHEN FISH ARE BITING in the Chesapeake Bay and its tributaries, it not only means sport and pleasure to thousands of anglers, but a good livelihood for watermen who take out fishing parties, and to other citizens of tidewater Maryland.

According to figures gathered by deputy commanders of the Maryland Patrol Fleet covering a period of one week, from August 22 to 29, 2,621 trips were made from the major fishing resorts of the Bay, and 16,805 persons engaged in the sport. At an average cost of $8 a boat trip, the watermen who hired their boats received $20,968. It was estimated that approximately half of these pleasure seekers remained at boarding-houses and hotels for two days, spending approximately $5 a day, which would mean that they put $83,190 in circulation for that item alone. There is no means of knowing how much additional money was spent for bait, or gasoline for their autobiles. Roughly, it may be said that anglers resorting to Maryland waters spend in the neighborhood of $100,000 a week in pursuit of their favorite sport.

The greatest number of boat trips was made from the Solomon's Island-Patuxent River district, according to the local deputy commander's report, which showed 606 boats having taken out around 5,000 persons. Next in importance was Potomac River, around Blakistone Island, with 345 boats taking a total of 2,070 persons. Reports from other sections were as follows:

| | | |
|---|---|---|
| Chesapeake Beach and Herring Bay | 259 trips, | 2,072 persons fishing |
| Rock Point, Potomac River | 232 trips, | 1,392 persons fishing |
| West River | 218 trips, | 1,308 persons fishing |
| Cambridge, Great Choptank River | 212 trips, | 656 persons fishing |
| Severn River section | 208 trips, | 1,040 persons fishing |
| Great Choptank River, off Tilghmans | 184 trips, | 1,472 persons fishing |
| Deals Island, Crisfield, Pocomoke Sound | 114 trips, | 535 persons fishing |
| St. Michaels, Miles River | 56 trips, | 280 persons fishing |
| Wicomico River, off Bivalve | 56 trips, | 250 persons fishing |
| Oxford, Tred Avon River and vicinity | 42 trips, | 210 persons fishing |
| Rock Hall | 48 trips, | 240 persons fishing |
| Broome's Island, Upper Patuxent | 27 trips, | 216 persons fishing |
| Smith's Creek, lower Potomac | 14 trips, | 64 persons fishing |

## LITTLE CHOPTANK RIVER OYSTER SITUATION

FOLLOWING A REPORT to the Conservation Department that oysters were dying in Little Choptank River, the Commissioner directed Dr. Truitt, of the Solomons Laboratory, to

proceed to the river in question and make an investigation. Following is Dr. Truitt's report:

"Oysters are badly affected in the Little Choptank. Approximately 45% of all one-year and older oysters are dead. The agency of destruction has been arrested, and no oysters have died in the past six weeks or two months. The condition of the Little Choptank oyster beds is very much like that which existed in the York River and the nearby regions of Virginia two years ago when there was such a high mortality. The oysters showed no fall (1931) or spring (1932) growth, have blunt (mouth) shells, thickened edges, etc. The inner shell deposits are unwholesome, "blistery," and dark. At least one year's growth has been lost due to the agency that was at work.

"We were fortunate in that I have several records of the physical nature of the water in the Little Choptank taken in different years and at this season. The water is now normal in salt (1.008 specific gravity) content and its chemical nature is standard, with a reading of 8.2 hydrogen-ion concentration. This is very encouraging. There is every indication that the trouble is over from the appearance of the oysters, the chemistry involved, and the physics. This is borne out further by the fact that during the past fortnight there has been a catch of fair proportions. I say 'of fair proportions' since this body of water usually has an unusually heavy set of spat. The present catch is satisfactorily heavy, even though below normal from 25%-40% of an average year. After examining the beds, noting condition of the adult (poor) oysters and taking everything into consideration I feel that it is a streak of good fortune that there is a catch at all.

"The destruction in the Little Choptank extends throughout the length of the river. We could not locate private oysters on leased grounds though we passed leased areas. Of the four big natural bars investigated the mortality was as follows: Saltworks, 55%; Woolford's, 45%; Hooper's Point, 45%, and Ragged Point, 40%. This last bar, which is the best one in the river, as far as size and quantity of oysters go, was less severely affected than any other. It likewise has the best catch at this time.

"While the living oysters in the Little Choptank are barely more than water blisters, so poor are they, some are still making up milt and spawning is now going on. From the general situation over there I feel that, weather favorable, a fair catch will be had this coming two weeks.

"An interesting feature of this trouble is the fact that the living oysters are covered with and riddled by the common boring sponge, *cliona celata*. This pest is troublesome in many places, but it is generally considered not to destroy oysters. in the Little Choptank it is entirely suspicious and from now on we will give it thought and study here at Solomons. I wish we had been called in last winter when this trouble first started. It is my opinion that April and early May saw this trouble at its height."

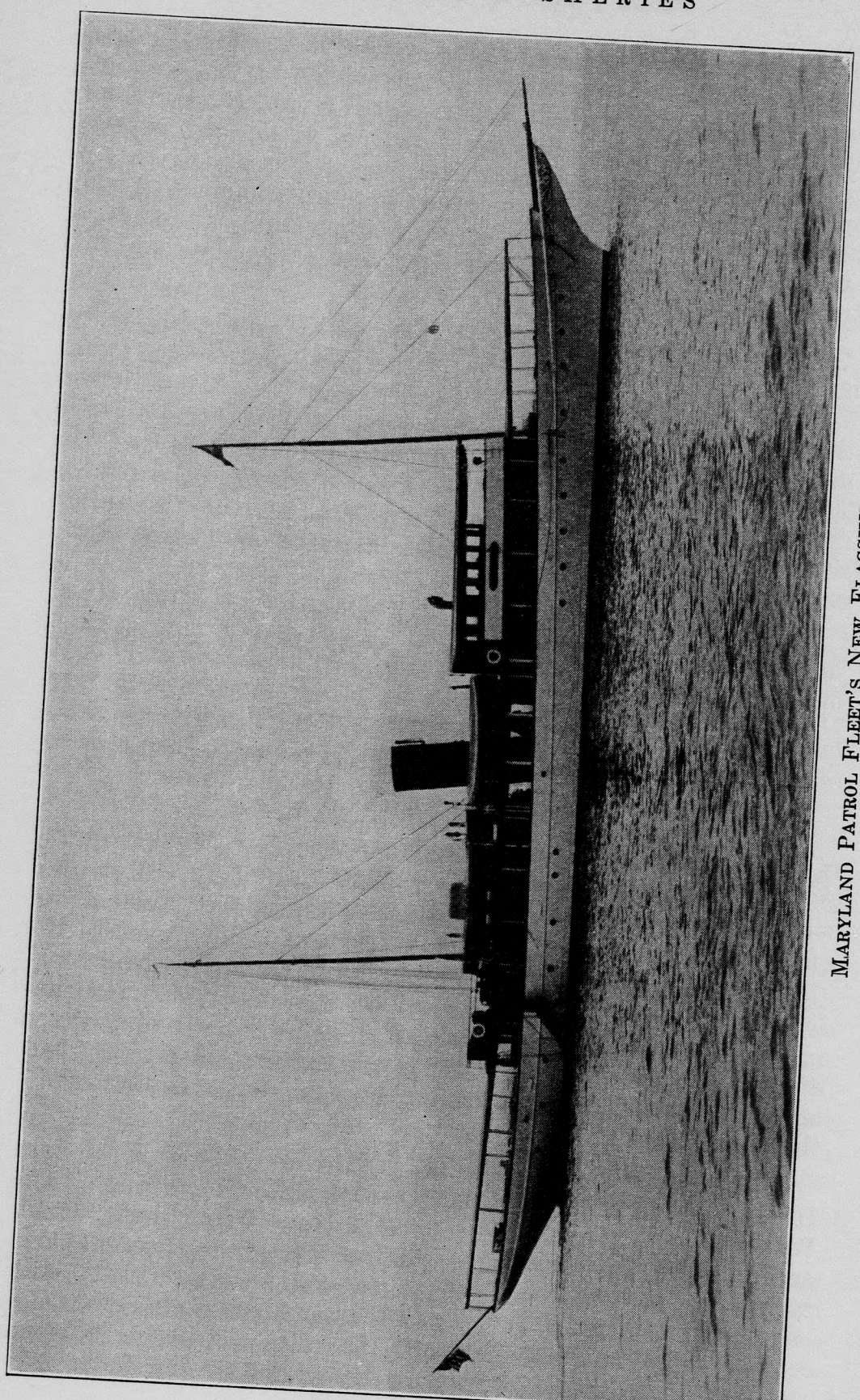
After the storm of last March, with its attendant high tides and usual wind conditions, the Department had a report that many of the oyster bars had sanded, and it is believed that this should be taken into consideration in accounting for the mortality which has occurred in Little Choptank River. Dr. Truitt is of the opinion that the trouble seems to have been at its height during April and early May, and he also refers to the fact that the present catch is satisfactorily heavy, even though below normal.

The oyster bars in this river will be carefully watched during the winter and next spring to see if there is a recurrence of the mortality.

## NEW FLAGSHIP OF MARYLAND PATROL FLEET REACHES MARYLAND

NEGOTIATIONS for the "Saelmo," the new flagship of the Maryland Patrol Fleet, to replace the "Tech," destroyed by fire April 13, were completed by Commissioner Earle about the middle of August, and the vessel was turned over to the Commissioner by the Todd Shipbuilding Company, of Brooklyn, from whom it was purchased, on September 10. The contract price of the vessel, which came well within the insurance obtained on the "Tech," included the building of a new pilothouse to replace the open bridge, and the entire equipment of the boat.

The "Saelmo" was originally built in 1914 for the late Horace Dodge, who called her the "Nokomis," and during the World War he turned her over to the Navy Department, which accepted her for war service. The records of the Navy Department show that the boat was taken over on May 9, 1917, and renamed "Kwasind." After minor alterations and repairs she was commissioned December 5, 1917, and sailed for duty in the service of the Military Governor of San Domingo. On



MARYLAND PATROL FLEET'S NEW FLAGSHIP

this duty she remained until June 9, 1919, when she returned to Hampton Roads. The Navy Department sold her in December, 1919, to Mr. William H. Todd, a shipbuilder of Brooklyn, who completely remodelled her at a cost estimated to have been half a million dollars. Mr. Todd renamed the vessel "Saelmo" and virtually dedicated her to public service, so that she became known as New York City's semi-official yacht. Many persons of national and international prominence have been entertained on board the "Saelmo."

The "Saelmo was brought from Brooklyn to Baltimore, arriving on September 13, when transfer of the crew of the Steamer "McLane" was made. The latter vessel will be laid up and probably disposed of when a suitable offer is obtained for her. The "Saelmo," at the suggestion of Governor Ritchie, will be renamed "Du Pont," in honor of Mrs. T. Coleman du Pont, who presented her former yacht "Tech" to the State of Maryland about a year and a half ago.

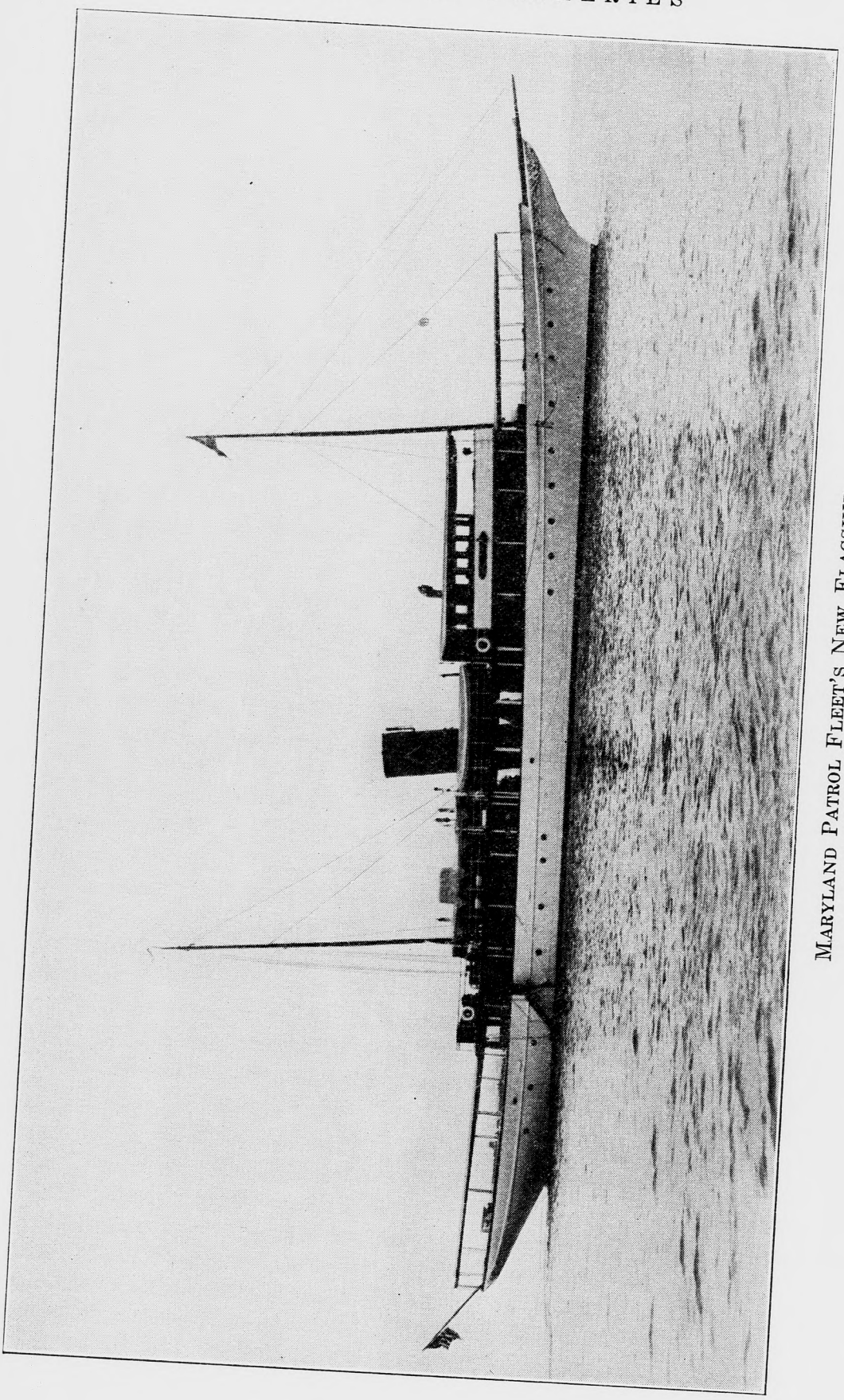
The Conservation Commissioner feels that the State of Maryland has obtained a real bargain in its new flagship, the price paid for her in no way representing her value. The "Saelmo" was placed on the market through the death of Mr. Todd, which occurred a short time ago, and the necessity for settling his estate. Prior to purchase of the boat, more than a hundred vessels had been examined by the Commissioner and other officials of the Conservation Department, but none of them entirely met the State's requirements.

The "Du Pont," as the "Saelmo" will henceforth be known, will be placed on active duty at once, having been delivered in Baltimore complete in every detail and ready for immediate service.

## "JAPANESE CRABMEAT EXPLOITATION"

(Reprint from *The Pacific Fisherman*, San Francisco, July, 1932, issue)

ENTERPRISE in merchandizing, for which the Japanese are justly famous, is well exemplified in the exploitation of Japanese canned crabmeat in the American market. This work has lately taken on new and interesting phases, indicating that the Japanese are wide-awake to the need and the possibilities of energetic sales promotion; and their methods are worthy of attention as indicating what might be done by American producers of canned fish and specialties, and the sales competition which must be met by American fish producers if they are to hold their position.



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Within the few years since the Japanese crab canning industry became organized under government auspices, Japanese crabmeat has gained universal recognition in the American market as a standard, high-class grocery item, with nation-wide distribution. This has been accomplished by intensive cultivation of the field, in which well-organized merchandizing on a specialty basis and extensive advertising have gone hand in hand. The product has been known in this country for some 20 or 25 years, but in the earlier times neither production nor marketing was well organized, and the real development of the market has come mainly within the last decade.

The output, mainly exported to this country, has grown from 103,925 cases in 1921 to 585,452 cases in 1930. At the same time, Soviet interests have developed a sizeable export crabmeat industry; but the Japanese product has easily held its lead in the market. The demand has been adversely affected by economic conditions since 1929; but this has resulted in no discouragement or slackening of effort on the part of the producing and distributing organizations, who, instead, have been disposed to meet the situation by increased energy, seeking to place their campaign on a basis of the utmost effectiveness.

As the latest development of its advertising program, the Japanese Canned Crab Packers and Exporters' Association is adding to its schedule a series of newspaper advertisements in about a dozen cities of the United States which have been found to be the most promising markets. This will reinforce the already extensive magazine advertising. Both newspaper and magazine copy are well designed for a strong appeal to the appetite of the American consumer.

At the same time, it is announced that a cooperative tie-up arrangement has been effected, through which Japanese crabmeat is being featured in advertising in conjunction with products of the Kraft-Phenix Cheese Corporation, which will distribute window-display material for crabmeat through its mayonnaise outlets—both products being featured in counter display cards and window streamers showing particularly how they may be combined in salads.

It is stated also that plans have been developed under which Japanese crabmeat will be featured along with Knox gelatine in summer magazine advertising. This is evidently an outcome of last year's developments, in which the crabmeat campaign stressed the creation of new uses for the product. To this end a recipe contest was conducted in two leading Eastern

markets, and a recipe book, based on the 8,500 recipes submitted, is now being distributed on requests turned in on coupons attached to the advertisements. Many of the recipes suggested the use of crabmeat with gelatine; and at the same time the Knox gelatine advertising was being tied up with other combination products, such as pineapple, prunes, and the like.

The systematic exploitation of Japanese crabmeat in this country by a unified campaign dates from 1924, while increasing pressure through national advertising has been exerted since 1928.

Japanese crabmeat has been welcomed by the American trade as an item having strong appeal to the consumer. . . . . It is made from the deep-sea king crab, and its handsome red color and large pieces give it a highly attractive appearance. Limited quantities of crabmeat are produced on this coast (Pacific) from the small "Dungeness" crab (*cancer magister*), which does not compare in appearance with the oriental product, although decidedly superior in flavor and tenderness; but the quantity available is too limited to make it much of a competitive factor. It would no doubt be possible, also, for Americans to develop a crabmeat industry based on the king-crab resources of Bristol Bay, where the Japanese have lately been getting part of their supply; but such a product would of course be in direct competition with the Oriental article, and for this and other reasons American packers have thus far shown little interest in it.

From the fish packer's standpoint, however, Oriental crabmeat offers very real competition to all of their products—not only to fresh crabs and fish, canned and cold-pack crabmeat, but to shrimps, tuna, salmon, sardines, etc. In fact (though it is not commonly realized, since most items are distributed through different trade channels) all sea foods are in competition for the consumer's dollar with all other sea foods, whether canned or fresh; and also with all other foods adapted to similar purposes. A family, for instance, which has crabmeat salad for luncheon is unlikely to eat tuna or sardines at the same meal, or a salmon dish for dinner; and every pound of foreign fish product imported replaces, to some extent, a similar quantity of some domestic fish.

The Japanese, in their exploitation of crabmeat, have gained a position several steps ahead of most American fish producers. Not only so, but American producers of many competing foods —especially meat in various forms, whether fresh, canned, or

cured—have shown a degree of enterprise far in advance of most operators in the fishing industry. The old times, when food products were bought rather than sold—when general recognition and "consumer acceptance," rather than sales effort and consumer education, could be relied on to maintain the market—seem to have passed into history. Other products, by systematic merchandising and exploitation methods, are encouraging and have already encroached seriously on the market for American sea foods.

Whether we like it or not, it looks as if American fish producers in all lines will have to take a leaf from the book of the Japanese crab packers if they are to hold their traditional position of importance. It is not a matter of "starting something" new, but rather of "keeping up with the procession." Unless they adopt some more effective means of promotion than most of them have followed in the past, they are in serious danger of being outstripped and left behind by other foods, both domestic and foreign.

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[Note—The U. S. Tariff Commission, under authority and by direction of Senate Resolution No. 122 (Sen. P. L. Goldsborough, Maryland), will hold a hearing on the subject of crabmeat tariff on Tuesday, October 4, 1932, at 10 A. M., Old Patent Office Bldg., 7th and E Streets, N. W., Washington, D. C. Our domestic crabmeat industry should be very strongly represented at this hearing.]

## IN THE MAIL

### Thinks Abolition of Purse-Net Has Already Benefited Bay Fishing

Clarendon, Va., August 18, 1932.

MR. SWEPSON EARLE,
*Conservation Commissioner,*
Annapolis, Maryland.

DEAR MR. EARLE—For some days I have been feeling a strong urge to take the time to write you relative to the subject of this letter. I have been very anxious, indeed, to tell you what a wonderful thing has happened in the Chesapeake Bay waters, seemingly overnight, one might almost say.

I refer to the remarkably quick "comeback" of good fishing in the Bay waters adjacent to Washington, D. C., since the

abolition of the destructive purse-net fishing, which, by Maryland law, came to an end last November.

I am one of the pioneer cottagers of the Chesapeake Bay region, having built my cottage on the shores of Herring Bay over 10 years ago.

I was lured to the Bay region by the splendid salt-water fishing I enjoyed the very first trip I happened to make to the western shore of Chesapeake Bay, more than 10 years ago. For the following two years after my first trip to the Bay, the fishing appeared to hold more or less good. Then I began to notice a gradual falling off in the size of the catches, with each passing year, until the fishing became so exceedingly poor that it was not worth one's time to go out on the waters, as there was nothing to catch. That, at least, is the experience of those followers of the rod and reel who attempted to enjoy fishing on the west side of the Bay. The purse-netters, with their havoc-playing nets, had combed the waters so effectually with their deadly equipment that attempting to fish in the Bay with rod and reel was only a mockery.

But, wonder of wonders, the fish are back again! As if by magic, the big hardheads, trout, and bluefish are biting freely once more on the old fishing grounds of the Bay. There can be no explanation of the present fine catches of these much-prized fish except the absence of the hated purse-net.

It would do you good to stand on the shores of Herring Bay in the late evening, and after dark, at the present time, and look out upon the waters of the Bay and note the four to five-miles-long line of big, white motor boats, lights gleaming, carrying from four to eight persons each boat, the ladies being very much in evidence, too, on these well-loaded boats. What a pleased and happy lot these fishermen are, all busy pulling in fish!

No wonder our President caught the infection and just had to go fishing down on the "Chesapeake."

The abolition of the purse-net will be a big thing for the Bay region of Maryland. The good news will travel afar, and fishermen from everywhere will soon be flocking to the Bay. Money will be spent generously by the visiting lovers of piscatorial sport. Property along the Bay front will be in demand, thereby increasing Maryland's taxable wealth.

Enough said. Now let's go fishing!

Respectfully yours,

HARRY E. HAY.

# THE HISTORY AND PRACTICE OF SPAT COLLECTING IN OYSTER CULTURE*

By ROBERT A. LITTLEFORD

SCIENTIFIC INVESTIGATION carried on under diversified conditions, and over a wide territory, has shown again and again that the most vulnerable period in the life history of the American oyster is that concerned with the larval oyster becoming attached for a sedentary existence. It is rather common knowledge now that oysters lay eggs by the millions and that these eggs hatch into young, or veligers, which swim around freely in the water and grow for a matter of 15 to 18 days. Thereafter they lead a sessile life. It is this transition from the free-swimming to the sedentary form that appears to be the crisis in the life history of the oyster.

Under natural and more primitive conditions than exist just now, oysters grew to maturity and died of old age, leaving behind their skeleton remains or shells to form vast beds abundantly supplied with hard materials readily available for the purposes of larval attachment. However, with intensive oystering operations, fewer and fewer oysters left shell remains on the bars and depletion followed to a point in Maryland and many other states that has become alarming. This situation has induced highly specialized study in an effort on the part of the scientists to find materials that might be used to render the problem of spatting less difficult, and the hazards the young oyster must run less severe.

Free-swimming oysters will attach themselves to almost any hard object that may be found on the bottom or afloat, provided it be clean. The tiny size of the veliger makes it impossible for that organism to attach itself if particles of debris, slime, or other foreign matter appear on the hard object. Shells offer a rather ideal medium for this purpose, since they have sufficient bulk to stand up from the bottom, are quite hard, and withstand the wearing effects of water. Those individuals who plant shells to secure their own seed oysters learned very early that greater and greater catches were obtained when the shells were placed overboard during May and June; a fact that is borne out by scientific study, since it has been shown that oysters spawn and the young are abundant in the water during the early summer. However,

* Contribution from the Department of Zoology and Aquiculture of the University of Maryland.

shells have become so valuable because of their many uses, especially in chick-grit manufacture and the production of lime, that they are no longer so readily available and easily procurable as they were 15 or 20 years ago. This scarcity and consequent high prices has stimulated scientific research to make more detailed studies of the old problem of *spat fall* or *catch,* with the result that much attention during the past few years has been directed toward the development of cheap substitutes, equally efficient in gathering oysters and more easily handled than are shells. Rapid strides have been made towards a solution of the problem through work done in Maryland, and elsewhere along the Atlantic Coast. It is the purpose of this article to set forth some of the history and the general facts pertaining to the artificial collection of seed oysters.

Artificial gathering of oyster spat is in nowise a new problem. Pliny the Elder's history records the efforts of Sergius Orata, during the century before Christ, to restore nearly exhausted beds of the Adriatic Sea. So significant were Orata's efforts to rehabilitation of this natural resource that his methods in a big measure are used today in that section of the world and depletion has long since been checked. Pliny attributes no small part of Orata's vast wealth to his introduction and use of oyster culture. Adriatic oystermen today, as of old, make great stone piles on the deep, black mud of the bottoms. Mature oysters are brought from their breeding centers and placed on and around these stone piles to supply the spawn. Around the stone piles stakes are driven down and a cord is run from one to another. From this cord bundles of twigs are suspended. The oyster larvae attach themselves and grow to seed sizes. The seed oysters are allowed to remain attached to the bundles until they have reached a fair degree of maturity, at which time they are removed and planted on bottoms which are suited to their further development.

In 1853, De Bon, the Commissioner of Marine in France, was asked to devise a method for the depleted oyster beds of that country. After making a thorough study of Orata's system, he put into effect a scheme whereby rough boards were used, being placed about eight inches above the bed, near low-tide mark. This board floor was covered with loose bundles of twigs upon which the spat were collected. This scheme, while something of a success in that spat were secured, was not satisfactorily profitable and, therefore, did not come into general use. In 1855, Monsieur Coste, of France, decided to try

out experimentally a number of ideas in order to secure a profitable method for the gathering of seed oysters. He was aided in 1857 by sums from the Emperor. Coste purchased 3,000,000 oysters, which were planted on carefully selected and prepared bottoms. However, instead of going to the expense and trouble of building an elaborate floor, as had his predecessor, he merely anchored bundles of twigs about a foot above the bottom. On one of these bundles of twigs he had about 20,000 spat. To measure the success of Coste, we need but mention that when he began his work 18 of the 23 major oyster beds of France had been destroyed, and the rest so depleted as to be of no economic importance; while by 1863 16,000,000 oysters were being harvested from less than one-half of 100 acres under his control. Within the next decade, 492 acres of oyster bars were under cultivation and valued at some $8,000,000; an increase of several hundred per cent.

In 1855, an American, Henry Bell, of Bell's Island, started experimenting in the Norwalk River, Conn., by planting shells around the small islands in the mouth of the river. This might be called the beginning of American experimentation with spat collectors. Since that time experimenters have worked toward the common goal of finding the best and cheapest method of spat collecting possible. The first important thing discovered was the fact that, as already pointed out, larvae must find a clean surface at the time of establishment before they can cement themselves and become fast. The necessity of a clean surface for establishment markedly affected the time when spat collectors could be put overboard. To plant them before or early in the spawning season would allow them to become slime and mud covered, thus preventing a good catch. In this respect, swift currents have a great advantage over slow and sluggish ones for best results. Thus it follows that spat collectors must be put overboard during the main part of the spawning season, which for the Eastern and Middle Atlantic States is reached early in July.

Since hard objects form the best cultch materials for oyster larvae establishment, it is obvious that a great variety of materials could be suggested for this purpose, the biggest factor being cost of production and efficiency in collecting oysters. Such materials might range from broken glass to pulp-wood, and many and diversified kinds of things have been attempted in the collection of oyster seed. In Connecticut considerable success was obtained from gravel, the principal advantage of which is the fact that the small size is productive

of seed that are single rather than in big clumps. Glass, bricks, tar paper, brickbats, and the like have been tried again and again in various parts of the world. Although these substances have caught spat, sometimes with remarkable success, they have never demonstrated that they have strong enough attracting qualities to overcome the difficulties in obtaining and handling the materials. All cultural materials do not show equal efficiency in spat collecting and this in turn becomes a fact in the choice of cultch. In New Jersey, scallop and mussel shells have been tried with rather definite success, the chief advantage being in the fact that the growing oysters break the fragile shells and prevent overlapping. Many young oysters are saved which otherwise would be suffocated or crowded out in a case of this kind. However, while successful on a small scale, this method could not be put into general use because of the limited supply of materials.

Perhaps one the most interesting methods of spat collecting is the use of tile. This method, like several others, originated in France, where it met with rather general success. Its use spread to several other European oyster-producing areas. The tiles used are shaped like a common drain-pipe split lengthwise. These are lined to facilitate the removal of the growing spat without destroying them, while at the same time the tiles are protected to be used over again. In some cases, however, each young oyster to be transplanted is removed with about one square inch of broken tile as the base. The tiles are coated by immersing them in a clear mixture of quick lime and sand, and then dipping them in cement of an established formula. Spatting for the most part takes place on the concave surface of the tile.

Lt. Francis Winslow, 1879, performed many valuable experiments on Tangier Sound in Maryland. On July 9, he sank some tiles attached to a wooden frame in order to have them rest about six inches from the bottom. On August 2, these tiles were raised and 348 young oysters were found on one tile of about one square foot area. At that time oyster seed were so abundant throughout the Chesapeake that Lt. Winslow's efforts at spat collecting were not pushed with vigor, and little was done to further the cause of artificial seed production. There are about as many different ways of laying tiles as there are people carrying on the experiments. In Sidney, Australia, for example, the tiles are placed in crates and lowered over the beds. Tiles have been used almost exclusively, and with great success in that part of the world, other cultch materials proving to be inferior.

As matters now stand in American spat-collecting, shells offer the cheapest and best method of obtaining young oysters. As yet shell prices are not prohibitive, and shells can be obtained. In addition to being effective collectors, shells add lime and other valuable products to the water, and they are the most natural of all materials used. Shells are applied in one or two, or even three different ways. The foremost method used is to spread them evenly over the bottom, though on certain areas it has been found advantageous to plant them in small mounds, or in still other cases to deposit them in windrows.

In some localities, such as the Pogumock River, near Grotan, Conn., the bottoms are so muddy that floating collectors are necessary if oyster seed is to be obtained locally. In the particular river named, bundles of white-birch bushes have been suspended in the water with worth-while results. The bundles are removed from the water at intervals for the purpose of observation. Seed secured are taken to suitable beds for growth purposes.

Most of the materials mentioned as spat collectors so far have some factor or factors that make them of value. As cited, scallop and mussel shells break easily and waste away, thus saving many young oysters. Oyster shells undoubtedly are the cheapest and most abundant material now available as collectors. Galtsoff, U. S. Bureau of Fisheries, feels that the elaborate method of the Europeans can be used only in a country where labor is cheap and the price of oysters high. Under American conditions the problem is to find the most efficient and simplest method of collecting seed oysters with a minimum amount of labor. To this end Dr. Galtsoff conducted a series of experiments in spat collecting in Wareham River, Mass., in the summer of 1926. He filled wooden crates with scallop and oyster shells and scattered scallop shells over the bar on which the crates were planted. The crates remained undisturbed until the end of August, at which time they were brought up and the number of spat counted. The bar was divided into equal areas and representative samples were taken from each and the spat counted. From his results he noted that scallop shells were unsuited for the purpose at hand, as many of them were washed out and those in the middle of the crate were ground by the action of the waves. Also, he noted that the available seed in the crate next to the bed was much greater than on the shells scattered over the old bed, and that the controlled cultch showed many times more spat than were

realized on adjacent portions of the natural bed. The crate method worked here under experimental conditions. By using a more durable shell, such as those from the oyster, still further advantages are possible from this method of spat collecting, the exposure of shells in three dimensions instead of two being much more efficient.

After a series of experiments in Milford Harbor, Conn., Prytherch, another Bureau of Fisheries agent, found that the method of spat collecting by placing shells in wire bags could be successfully applied on a commercial scale on the inshore areas of the North Atlantic States. He realized a catch on 90% of the shells used, and the number per shell ran up into the three-digit figures.

At the Chesapeake Biological Laboratory, located at Solomon's Island, Md., a series of experiments has been carried on under the direction of Dr. R. V. Truitt, in regard to the value of the many materials suggested for use, to wit: Shells, gravel, glass, cinders, and wood. These materials were suspended in baskets, some at the top and others at the bottom of the water, under fine conditions, the same throughout. The plantings were made after the oyster larvae appeared in great numbers during the years 1920, 1925, and 1928. The baskets were of galvanized wire, cylindrical in form, and held 40 average-sized oyster shells. The shells used were equally divided right and left valves, while the pebbles averaged $\frac{3}{8}''$ to $\frac{1}{2}''$ in diameter. The cinders were partially crushed slag and some unburned coal, while the glass came from available sources and was broken into pieces ranging from one to five inches in area. The results of the entire series of experiments are as follows:

"The shells averaged 33 spat per basket; glass produced 16; cinder, largely on the unburned coal, produced four; while pebbles and brick produced an average of three spat per basket each. This would indicate that shells are 100% more effective as spat collectors, at Spencer's Wharf (where the work was done) at least, than is glass, the second in line of production. His almost negative results with wood material, as cultch, is of interest. Taking into consideration the availability of materials, shells are unqualifiedly the most effective form of cultch, having not only the advantage of close proximity for planting purposes, cheapness and ease of handling, but they, after being planted, add to the lime content of the water, a factor that may be of importance."

Dr. Truitt has also done extensive work with wire baskets filled with shells. Also, with concreted paper in the form of partitions. Exceptional success was obtained in the first case, while, according to his report, the latter is still in an experimental stage, without results considered encouraging.

The egg-crate collector was developed by Prytherch in 1929, and is a series of waterproofed cardboard partitions covered with a thin coating of cement. It has a collecting surface of about 1,000 square inches. In great South Bay, Long Island, and in Milford Harbor, these partitions proved very satisfactory, collecting 2,000 to 25,000 spat on a single partition. The advantages of this type of seed collectors are that they are not extremely costly, and collect large numbers of spat, which can be easily separated when several months old.

In the Chesapeake in 1930, negative results were obtained in the use of the egg-crate type of collector. This was due to two facts: First, they were not put overboard until after the peak of spat-fall of the season had occurred; and, second, there was no general catch in the Chesapeake during August and September of that year. However, those placed in saltier waters along the seaside gave astounding results. Here all of the crates were covered with spat, the number being estimated at between 9,000 and 12,000 per crate.

During 1931, 12,000 standard-type collectors were tried, besides 500 of a special design. Twenty-six plantings of not less than 50 sections each were made in representative places on the Chesapeake Bay throughout the region below Tilghmans Island—North Beach section. In only three of the 26 plantings were catches of practical value realized.

It is interesting to record that the oyster, long an epicurean delight, and for centuries a therapeutic wonder, is now receiving intensive study and experimentation in an effort not only to assure its safety in the conservationist's way, but to enhance its quality and quantity so that this heritage from the sea may take its rightful place as the leader in fisheries economics. With the type of scientific leadership heading the investigational work, and with states and nations of the world subsidizing their efforts, this wild form promises much for the future. Maryland can take prideful part in the program being conducted to this end.